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Instructions for Preparation of Papers and Notes ..... **Back Cover, November Journal**

Table I. C_3A-NC_8A_3 Join Compositions Corresponding to the Formula $(9-x)CaO \cdot xNa_2O \cdot 3Al_2O_3$

x	Theoretical Na_2O (wt%)	Al_2O_3 (wt%)	CaO (wt%)	Analytical Na_2O (wt%)
0.0	0.00	37.73	62.27	0.00
0.1	0.76	37.70	61.53	0.73
0.2	1.53	37.68	60.79	1.68
0.3	2.29	37.65	60.06	2.25
0.4	3.05	37.62	59.33	2.69
0.5	3.81	37.59	58.60	3.91
0.6	4.57	37.57	57.87	4.20
0.7	5.33	37.54	57.17	5.43
0.8	6.08	37.51	56.41	5.86
0.9	6.81	37.48	55.68	6.39
1.0	7.59	37.46	54.95	7.70

desired soda content was attained. The soda contents of the fired samples are shown in the fifth column of Table I.

As shown in Table II, the only difference between the X-ray diffraction pattern for C_3A and the patterns for samples containing 2.25% Na_2O or less was a very small decrease in the d spacings of several peaks in the back reflection region. No change in position or intensity was detected for the three major diffraction peaks of C_3A, 2.699, 1.909, and 1.557 A, when the soda content was less than 2.25%. Microscopic examination of these samples revealed a single phase, excluding the very small amount of $C_{12}A_7$ or CaO that was also present, and which could not be detected with X-ray diffraction. The refractive index of each sample was practically identical to that of C_3A, 1.71. However, the grains appeared very slightly birefringent under crossed Nicols. For the samples containing 2.25% Na_2O or less, it is concluded that C_3A is not present in these samples as the pure compound, but instead, as a single-phase crystalline solution of Na_2O in C_3A.

A second phase appeared in samples containing more than 2.25% Na_2O. This phase was characterized by a splitting of each major diffraction peak of C_3A into two peaks, both differing from the corresponding C_3A peak. The underlined values in Table II denote the d spacings of the split diffraction peaks. These d spacings are quite close to the d spacings reported previously by Moore.[1]

X-ray diffraction peaks corresponding to both the "split-peak" phase and the C_3A phase were detected in the samples where $x = 0.4$ and $x = 0.5$ (Table II). These were the only samples in which both phases were detected simultaneously. These two phases are tentatively identified therefore as two crystalline solution phases, a crystalline solution of Na_2O in C_3A and a crystalline solution of NC_8A_3 deficient in Na_2O.

Several attempts were made to prepare NC_8A_3, but this compound was never obtained as a single phase. Samples having a composition corresponding to NC_8A_3 always contained free CaO when fired at 1250°C for 15 minutes.

Table II. Interplanar Spacings of 1250°C Tie Line Compositions Corresponding to $(9-x)CaO \cdot xNa_2O \cdot 3Al_2O_3$

C_3A (A)	$x = 0.1$ (A)	$x = 0.3$ (A)	$x = 0.4$ (A)	$x = 0.5$ (A)	Intensity*
4.23	4.23	4.23	4.23	4.23	W
4.08	4.07	4.07	4.08		M
			3.43	3.44	W
3.33	3.32	3.33	3.33		W
			3.36	3.36	W
3.05	3.05	3.04	3.05	3.06	W
2.834	2.831	2.830		2.820	W
2.786	2.786	2.786	2.786 (W)		M
			2.720	2.720	SS
2.699	2.699	2.699	2.699	2.700	SS
			2.433	2.433	WW
2.384	2.378	2.378	2.381	2.379	W
2.202	2.199	2.200	2.202	2.206	M
2.039	2.039	2.039	2.037	2.037	M
1.951	1.954	1.952	1.959	1.963	W
			1.918	1.920	S
1.909	1.906	1.906	1.906 (W)	1.906 (WW)	S
			1.890	1.892	S
1.823	1.819	1.823	1.827 (WW)		W
			1.750 (WW)	1.750	W
1.617	1.616	1.619	1.622	1.620	WW
			1.562	1.564	S
1.557	1.555	1.559	1.558 (W)	1.560 (WW)	S
			1.553	1.552	S
				1.358	M
1.349	1.348	1.350	1.347	1.347	M
1.0199	1.0192	1.0189	1.0190	1.0220	M
1.0176	1.0169	1.0161	1.0161	1.0160	W
0.8995	0.8988	0.8983	0.8983	0.9039	W
0.8971	0.8965	0.8963		0.9019	WW
0.7789	0.7784	0.7780	0.7782		W

* NOTE: W = weak; M = medium; SS = very strong; WW = very weak; S = strong.

In a portland cement containing 10% C_3A, a soda content of 0.76% would normally be required to convert the C_3A to NC_8A_3 if all the soda reacted with the C_3A. The results of this investigation, however, show that a soda content of only 0.3% would be sufficient to convert the C_3A to a phase which has an X-ray diffraction pattern similar to the compound NC_8A_3 and quite similar to that observed by Moore.[1]

Although the present investigation is not considered a true phase equilibrium study, the results indicate that the join C_3A-NC_8A_3, as given in the phase diagram Na_2O–CaO–Al_2O_3,[2] may be incorrect.

CORRECTION

Growth of Oxide Crystals by the Flux Method

by Michael Schieber

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Reference (1) was omitted from the first paragraph. The third sentence should read: "It was recently reported[1] that it was impossible to grow pure single crystals of this compound by the Nielsen procedure.[2,3]"

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5. $K_2O–Al_2O_3–SiO_2$
6. $FeO–Fe_2O_3–SiO_2$
7. $CaO–FeO–SiO_2$
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J. R. HAGUE, J. E. LYNCH, A. RUDNICK, F. C. HOLDEN and W. H. DUCKWORTH, Battelle Memorial Institute. 440 pp. Price $10.00. Price to members of the American Ceramic Society $8.00. Add $1.00 for each copy mailed outside the United States.

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ERNEST M. LEVIN, CARL R. ROBBINS and HOWARD F. McMURDIE, National Bureau of Standards. Edited and published by the American Ceramic Society, 1964. 602 pp. $18.00 to non-members; $12.00 to members of the Society. Add $1.00 for each copy to be mailed outside the United States.

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(b) metal oxide systems
(c) systems with oxygen containing radicals
(d) systems containing halides
(e) systems containing halides and other substances
(f) systems containing cyanides, sulfides, etc.
(g) systems containing water

A more complete description of *Phase Diagrams for Ceramists* will be found on page 482 of the June issue of the CERAMIC BULLETIN.

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